REMARKS

Claims 1-29 are currently pending in the application. By this response, claims 26-29 are added. Support for new claims 26-29 can be found on paragraphs [0034] and [0036] of the instant published application No. 2005/0049992. No new matter has been added. Reconsideration of the rejected claims in view of the following remarks is respectfully requested.

35 U.S.C. §103 Rejections

Claims 1-6, 18 and 20-25 were rejected under 35 U.S.C. §103(a) for being unpatentable over U. S. Patent No. 5,752,025 issued to Shakib *et al.* ("SHAKIB") in view of U. S. Patent Application Publication No. 2002/0120617 issued to Yoshiyama *et al.* ("YOSHIYAMA"). Claims 7, 10-13 and 17 were rejected under 35 U.S.C. §103(a) for being unpatentable over SHAKIB in view of YOSHIYAMA and further in view of U. S. Patent Application Publication No. 2001/00156428 issued to Gajda *et al.* ("GAJDA"). Claim 19 was rejected under 35 U.S.C. §103(a) for being unpatentable over SHAKIB in view of YOSHIYAMA and further in view of U. S. Patent Application Publication No. 2003/0088739 issued to Wilkes *et al.* ("WILKES"). Claims 8-9 and 14-16 were rejected under 35 U.S.C. §103(a) for being unpatentable over SHAKIB in view of YOSHIYAMA and GAJDA, and further in view of WILKES. These rejections are respectfully traversed.

The Examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the

references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP §2142.

The Examiner asserts that the applied prior art teaches or suggest all of the features of the claimed invention. Applicants respectfully disagree and submit that the Examiner has failed to establish a *prima facie* case of obviousness.

Claims 1-6, 18 and 20-25 in view of Shakib and Yosiyama

The present invention generally relates to optimization of database performance, and more particularly, optimization of performance in non-relational databases. In non-limiting exemplary implementations of the invention, a server provides database access and management control to a non-relational database. The server accepts database inquiries from one or more clients and accesses the database accordingly and returns the results of the inquiry. By reducing the view index size, implementations of the invention may increase efficiencies in processing time, bandwidth and/or memory management.

More specifically, in non-limiting implementations of the invention, at least one view of the database is created by defining columns. The view index size is kept at a level that optimizes database performance by categorizing and sorting only a first subset of the columns contained within the corresponding view. The remaining columns of the view constitute a second subset and are marked as having been indexed, but are not actually used to build the index. The second subset of columns may be visible as

collapsed data to a client for issuing a query, since all columns are marked as indexed. When a query is performed on at least one column of the second subset, a sort and categorization of the at least one column is performed. This results in some data being indexed at run time. However, since the second subset of columns are not initially indexed, the total number of indexed records is substantially less, the view index size is reduced, and overall performance is increased.

Independent claim 1 recites, in part,

> ...sorting and categorizing a first set of columns within a view of the database; and
> marking a second set of columns within the view as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns, the second set of columns including all columns exclusive of the first set of columns.

Independent claim 18 recites, in part,

> ...a component to sort and categorize a first set of columns within a view of the database;
> a component to mark a second set of columns within the view, wherein the second set of columns comprises all columns within the view that are not in the first set of columns, and wherein the mark indicates that sorting and categorizing has been performed on the second set of columns without actually having performed the sorting and the categorizing...

Independent claim 25 recites, in part,

> ...a first computer program code to sort and categorize a first set of columns within a view of a database;
> a second computer program code to mark a second set of columns within the view, wherein the second set of columns comprises all columns within the view that are not in the first set of columns, and wherein the mark indicates that sorting and categorizing has been performed on the second set of columns without actually having performed the sorting and the categorizing...

These features are not shown or suggested by the applied references.

The Examiner asserts that SHAKIB discloses sorting and categorizing a first set of columns within a view of a database. The Examiner admits, and Applicants agree, that SHAKIB does not disclose or suggest marking a second set of columns within the view as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns, the second set of columns including all columns exclusive of the first set of columns. The Examiner, however, asserts that YOSHIYAMA teaches these features at paragraph [0035], and that it would have been obvious to modify SHAKIB by adding these features.

Applicants respectfully disagree and submit that no proper combination of the applied references teaches or suggests all of the features of the claimed invention. More specifically, Applicants note that none of the applied references teaches or suggests marking a second set of columns within a view of a database as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns (claim 1) and/or wherein the second set of columns comprises all columns within the view that are not in the first set of columns, and wherein the mark indicates that sorting and categorizing has been performed on the second set of columns without actually having performed the sorting and the categorizing (claims 18 and 25).

SHAKIB discloses a method and system for creating and displaying a table of categorized data. The table, called a categorization table, is analogous to the well-known computer directory tree structure with expandable and collapsible headings (FIG. 3). More specifically, a plurality of data records 10 are accessed through a sorted index

12. A header table 14 references the plurality of data records 10 through the sorted index 12 (FIG. 1). The sorted index 12 contains a separate entry corresponding to each data record contained in the plurality of data records 10. The header table is traversed to create and display a categorization table on a display means (FIG. 3). SHAKIB does not, however, teach or suggest marking a second set of columns within a view of a database as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns. The Examiner correctly acknowledges as much.

YOSHIYAMA does not cure the above-noted deficiencies of SHAKIB. YOSHIYAMA discloses a database retrieval method that is based upon a comparison of costs of different retrieval techniques. The method is useful for irregular retrievals where an already generated index cannot be used in many cases. In the method, a structured query language (SQL) statement (i.e., query) is parsed (see paragraphs [0046] and [0058]; and FIG. 5). Based upon the parsing, a cost calculation is performed to determine the fastest way to access the database (see para. [0059]). The costs of three retrieval techniques are calculated: (i) access made by entire scanning on all of the data in the database; (ii) access made by using an already existing index or dynamic index; and (iii) access made by creating and using a dynamic index (see para. [0063]). The technique that is deemed the fastest is used to actually access the database and retrieve the data in response to the query (see para. [0063] – [0066]).

The Examiner is simply not correct that paragraph [0035] teaches the missing acknowledged to be missing from SHAKIB. Paragraph [0035] of YOSHIYAMA explains the following:

[0035] With this program, a step of making a comparison between a cost required when retrieval is performed after an index corresponding to a retrieval condition is generated and a cost required when entire retrieval is performed is first executed in a block 1 of FIG. 1. Next, in a block 2, a step of determining whether or not an index that satisfies a retrieval condition and is applicable exists among already generated indexes is executed, if the cost required when the entire retrieval is performed is higher as a result of the cost comparison made in the block 1. In a block 3, a step of generating an index corresponding to the retrieval condition is executed if an applicable index is determined not to exist in the block 2. In a block 4, a step of retrieving a database by using the index generated in the block 3 is executed. These steps are executed by a computer.

While it is true that the above-noted language discusses retrieving a database and generating an index, there is no mention of, for example, marking a second set of columns within a view of a database as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns and/or that the second set of columns comprises all columns within the view that are not in the first set of columns, and wherein the mark indicates that sorting and categorizing has been performed on the second set of columns without actually having performed the sorting and the categorizing. Indeed, the terms "marking" and "view" are no where to be found in the noted passage. Nor has the Examiner identified any features in YOSHIYAMA which the Examiner believes to be equivalent.

Applicants emphasize that YOSHIYAMA does not explicitly disclose a view of a database. Moreover, YOSHIYAMA simply does not teach or suggest marking a second set of columns within a view of a database as if the second set were already sorted and categorized prior to actually sorting and categorizing the second set of columns and/or wherein the second set of columns comprises all columns within the view that are not in the first set of columns, and wherein the mark indicates that sorting and categorizing has been performed on the second set of columns without actually having performed

the sorting and the categorizing. Instead, YOSHIYAMA teaches that non-indexed data

may be accessed in one of three ways: by a full scan, by using portions of existing

indexes, or by creating a new dynamic index. However, there is simply no mention of

marking a second set of columns as categorized and sorted before they are actually

categorized and sorted and/or wherein the second set of columns comprises all

columns within the view that are not in the first set of columns, and wherein the mark

indicates that sorting and categorizing has been performed on the second set of

columns without actually having performed the sorting and the categorizing, as recited

in the claimed invention. Therefore, no proper combination of SHAKIB and

YOSHIYAMA discloses or suggests all of the features of claims 1, 18 and 25.

On pages 2 and 3 of the instant Office Action, the Examiner asserts that "not

indexing" is similar to marking and/or that "not indexing" is marking by default, and that

YOSHIYAMA there teaches the recited marking. There is no basis for this assertion.

Furthermore, to the extent that the Examiner is basing the instant rejection on an

argument of inherency consistent with MPEP 2112, Applicants note that MPEP 2112

specifically states, in part:

> "In relying upon the theory of inherency, the examiner must provide a basis in
> fact and/or technical reasoning to reasonably support the determination that the
> allegedly inherent characteristic <u>necessarily</u> flows from the teachings of the
> applied prior art." *Ex parte Levy,* 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter.
> 1990) (emphasis in original) (Applicant's invention was directed to a biaxially
> oriented, flexible dilation catheter balloon (a tube which expands upon inflation)
> used, for example, in clearing the blood vessels of heart patients). The examiner
> applied a U.S. patent to Schjeldahl which disclosed injection molding a tubular
> preform and then injecting air into the preform to expand it against a mold (blow
> molding). The reference did not directly state that the end product balloon was
> <u>biaxially oriented</u>. It did disclose that the balloon was "formed from a thin flexible
> inelastic, high tensile strength, biaxially oriented synthetic plastic material." *Id.* at
> 1462 (emphasis in original). The examiner argued that Schjeldahl's balloon was

inherently biaxially oriented. The Board reversed on the basis that the examiner did not provide objective evidence or cogent technical reasoning to support the conclusion of inherency.).

The Examiner has neither stated that the rejection is based on inherency, nor provided any <u>basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art</u>.

Applicants emphasize that YOSHIYAMA provides no suggestion whatsoever of marking a second set of columns within a view of a database as if the second set were already sorted and categorized prior to actually sorting and categorizing the second set of columns, and the Examiner has not demonstrated otherwise.

Moreover, even assuming *arguendo* that YOSHIYAMA does disclose the above-noted features, which Applicants dispute, there is no proper motivation for modifying SHAKIB with such features. SHAKIB is directed to a method of displaying all of the data contained in a plurality of data records. The data is displayed in a categorization table that may have expanded or collapsed headings. All of the data in the data records or sort index is necessarily categorized and sorted before it can be displayed (col. 6, lines 33-35). Since SHAKIB is concerned with displaying all of the data, there would be no motivation to leave some of the data un-categorized and un-sorted. Therefore, there would be no motivation to mark a subset of columns categorized and sorted before they are actually categorized and sorted.

Furthermore, and contrary to the Examiner's assertion, there is no reasonable expectation of success that modifying SHAKIB with such features would "speed up data retrieval" in SHAKIB. In fact, SHAKIB is not directed toward data retrieval in the same

sense as YOSHIYAMA. Instead, SHAKIB is directed toward the creation and display of a categorization table that may have expanded or collapsed headings (see FIG. 3). YOSHIYAMA, on the other hand, is directed toward a database management system (DBMS) and the selective retrieval of data from a database based upon SQL statements (i.e., queries). SHAKIB makes no mention whatsoever of a DBMS or queries. Therefore, the motivation proffered by the Examiner is inapposite to SHAKIB, and there is no reasonable expectation of success of the proposed modification of SHAKIB.

Applicants submit that the Examiner has provided only conclusions of obviousness and neglects to set forth any prior art basis for modifying the teachings of SHAKIB. In establishing a *prima facie* case of obviousness under 35 U.S.C. § 103, it is incumbent upon the Examiner to provide a reason *why* one of ordinary skill in the art would have found it obvious to modify a prior art reference or to combine reference teachings to arrive at the claimed invention. *See Ex parte Clapp*, 227 USPQ 972 (B.P.A.I. 1985) To this end, the requisite motivation must stem from some teaching, suggestion or inference in the prior art as a whole or from the knowledge generally available to one of ordinary skill in the art and not from Applicants' disclosure. See, for example, *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 USPQ2d 1434 (Fed. Cir. 1988). As noted above, the applied documents are silent with regard to a number of recited features and relate to database systems which functions in a different manner. Moreover, YOSHIYAMA does not teach or suggest modifying the structure or operation of SHAKIB in the manner asserted by the Examiner.

Because the art of record fails to provide any reasonable explanation why one ordinarily skilled in the art would utilize such an arrangement, and/or fails to disclose or

suggest the problems that such an arrangement would address, Applicants submit that

the art of record fails to provide the requisite motivation or rationale as to *why* one

ordinarily skilled in the art would modify SHAKIB to include features of the invention in

the manner asserted by the Examiner. That is, Applicants submit that because the

Examiner has not set forth any basis or reason found in the art of record for modifying

SHAKIB, the instant rejection has no basis in the art of record, such that the rejection is

improper and should be withdrawn.

Rejections based on 35 U.S.C. § 103 must rest on a factual basis with these

facts being interpreted without hindsight reconstruction of the invention from the prior

art. The Examiner has the initial duty of supplying the factual basis for the rejection and

may not, because of doubt that the invention is patentable, resort to speculation,

unfounded assumption or hindsight reconstruction to supply deficiencies in the factual

basis. *See In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 177 (CCPA 1967). As

stated in *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ

303, 312-313 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984):

> [t]o imbue one of ordinary skill in the art with knowledge of the invention in
> suit, when no prior art reference or references of record convey or suggest
> that knowledge, is to fall victim to the insidious effect of a hindsight
> syndrome wherein that which only the inventor taught is used against its
> teacher.

Applicants submit that the only reason to modify the teachings of the applied

reference in the manner proposed by the Examiner is the result of a review of

Applicants' disclosure and the application of impermissible hindsight.

Finally, Applicants also submit that claims 2-6 and 20-24 depend from an

allowable base claim and are allowable for at least the reasons discussed above.

Moreover, these claims recite additional features that further define the present

invention.

Accordingly, Applicants respectfully request that the rejection over claims 1-6, 18

and 20-25 be withdrawn.

Claims 7, 10-13 and 17 in view of Shakib, Yosiyama, and Gajda

Independent claim 7 recites, in part,

> .. sorting and categorizing a first set of columns within
> a view of the non-relational database;
> marking a second set of columns within the view as if
> the second set of columns were already sorted and
> categorized prior to actual sorting and categorizing of
> the second set of columns, the second set of columns including
> all columns exclusive of the first set of columns.

These features are not shown or suggested by the applied references.

The Examiner asserts that SHAKIB teaches or suggests the elements of claim 7

except for marking a second set of columns within the view as if the second set of

columns were already sorted and categorized prior to actual sorting and categorizing of

the second set of columns, the second set of columns including all columns exclusive of

the first set of columns. The Examiner, however, is of the opinion that YOSHIYAMA

teaches these features, and that it would have been obvious to modify SHAKIB by

adding these features.

The Examiner also acknowledges that SHAKIB and YOSHIYAMA do not teach or

suggest the use of a non-relational database. The Examine, however, asserts that

GAJDA teaches a non-relational database, and that it would have been obvious to

further modify SHAKIB and YOSHIYAMA in view of the teachings of GAJDA.

Applicants respectfully disagree and submit that no proper combination of these references teaches or suggests all of the features of the claimed invention. As discussed above, neither SHAKIB and YOSHIYAMA teach or suggest marking a second set of columns within a view of a database as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns. Moreover, as discussed above, there is no basis or motivation to combine SHAKIB and YOSHIYAMA, and there is no reasonable expectation of success of the proposed combination of SHAKIB and YOSHIYAMA.

GAJDA does not cure the deficiency of SHAKIB and YOSHIYAMA. More specifically, GAJDA does not teach or suggest marking a second set of columns within a view of a database as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns. Applicants acknowledge that GAJDA discloses a system that improves access to non-relational database. GAJDA, however, does not disclose or suggest marking a second set of columns within a view of a database as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns, as recited in claim 7. Nor has the Examiner alleged otherwise. Thus, the applied references fail to teach or suggest each and every feature of the claimed invention.

As GAJDA, SHAKIB and YOSHIYAMA all fail to disclose or suggest marking a second set of columns within a view of a database as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns, there is no proper basis for combining the teachings of these documents.

Furthermore, because YOSHIYAMA explicitly relates to a <u>relational</u> database (see para. 0002), those skilled in the art would not replace the <u>relational</u> database with the <u>non-relational</u> database of GAJDA. Thus, this rejection is improper and should be withdrawn.

Applicants also submit that dependent claims 10-13 and 17, which depend from an allowable base claim 7, are allowable for at least the reasons discussed above. Moreover, these claims recite additional features that further define the present invention.

Accordingly, Applicants respectfully request that the rejection over claims 7, 10-13, and 17 be withdrawn.

Claim 19 in view of Shakib, Yosiyama, and Wilkes

The Examiner asserts that it would have been obvious to combine SHAKIB and YOSHIYAMA, and further in view of WILKES, and that the resultant combination teaches or suggests all of the elements of claim 19. Applicants respectfully disagree.

Applicants submit that claim 19 depends from claim 18 which is believed to be allowable for at least the reasons discussed above. More specifically, as discussed above, no proper combination of the applied references teaches or suggests marking a second subset of columns of a view of a database as categorized and sorted before the second subset of columns are actually categorized and sorted (claim 18). Therefore, the applied references do not teach or suggest every element of the claimed invention.

Furthermore, as discussed above, there is no motivation to combine SHAKIB and YOSHIYAMA as proposed by the Examiner, and there is no reasonable expectation of

success of the proposed combination. Therefore, the rejection is improper and should be withdrawn.

WILKES does not cure the deficiency of SHAKIB and YOSHIYAMA. More specifically, WILKES does not teach or suggest marking a second subset of columns of a view of a database as categorized and sorted before the second subset of columns are actually categorized and sorted (claim 18). Applicants acknowledge that WILKES relates to a system for data caching. WILKES, however, does not teach or suggest marking a second subset of columns of a view of a database as categorized and sorted before the second subset of columns are actually categorized and sorted (claim 18). Nor has the Examiner alleged otherwise. Therefore, the applied references fail to teach or suggest each and every feature of the claimed invention.

Accordingly, Applicants respectfully request that the rejection of claim 19 be withdrawn.

Claims 8-9 and 14-16 in view of Shakib, Yosiyama, Gajda, and Wilkes

The Examiner asserts that it would have been obvious to combine SHAKIB with YOSHIYAMA, GAJDA, and further in view of WILKES, and that the resultant combination teaches or suggests all of the elements of claims 8-9 and 14-16. Applicants respectfully disagree.

Claims 8-9 and 14-16 depend from claim 7, which is believed to be allowable for at least the reasons discussed above. More specifically, as discussed above, no proper combination of the applied references teaches or suggests marking a second subset of columns of a view of a database as categorized and sorted before the second subset of

columns are actually categorized and sorted (claim 7). Therefore, the applied references do not teach or suggest every element of the claimed invention.

Furthermore, as discussed above, there is no motivation to combine SHAKIB and YOSHIYAMA as proposed by the Examiner. Nor is there any motivation to combine SHAKIB, YOSHIYAMA, and GAJDA as proposed by the Examiner. Finally, as GAJDA and WILKES also fail to teach the features missing from SHAKIB and YOSHIYAMA, there is no basis for combining the teachings of these documents with those of SHAKIB and YOSHIYAMA. Thus, this rejection is improper and should be withdrawn.

Accordingly, Applicants respectfully request that the rejection over claim 8-9 and 14-16 be withdrawn.

New Claims are also Allowable

Applicants submit that the new claims 26-29 are allowable over the applied art of record. Specifically, claims 26-29 depend from claims 1, 7, 18 and 25 which are believed to be allowable. Moreover, claims 26-29 recite a combination of features which are clearly not disclosed or suggested by the applied art of record. Accordingly, Applicants respectfully request consideration of these claims and further request that the above-noted claims be indicated as being allowable.

CONCLUSION

In view of the foregoing amendments and remarks, Applicants submit that all of the claims are patentably distinct from the prior art of record and are in condition for

allowance. The Examiner is respectfully requested to pass the above application to

issue. The Examiner is invited to contact the undersigned at the telephone number

listed below, if needed. Applicants hereby make a written conditional petition for

extension of time, if required. Please charge any deficiencies in fees and credit any

overpayment of fees to Attorney's Deposit Account No. 09-0457.

                                    Respectfully submitted,
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